

Application No.: 10/019,448
Amendment dated May 27, 2003
Reply to Office Action of November 27, 2002

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 17-21 are pending in the present application. Claims 1-16 have been cancelled and Claims 17-21 have been added by the present amendment.

In the outstanding Office Actions, Claims 1-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over Ito et al. in view of Bogdanski et al. or Soma et al., which is respectfully traversed.

Applicants note Ito et al. includes the exact same inventors as the present invention (i.e., Yasutaka Ito and Yasuji Hiramatsu). Accordingly, because the inventors are the same, Ito et al is not prior art under 35 U.S.C. § 102(a) or § 102(e). Further, because the effective filing date of the present application is May 1, 2001 (i.e., the PCT filing date) and the publication date of Ito et al. is February 15, 2001, (i.e., the PCT publication date), Ito et al. is also not prior art under 35 U.S.C. § 102(b) (i.e., the PCT publication date of Ito et al. on February 15, 2001, is not more than one year prior to the effective filing date of the present application, i.e., May 1, 2001). Ito et al. is also not prior art under 35 U.S.C. § 102(c), (d) or (f). Accordingly, Ito et al. is not a valid reference, and this rejection is moot.

However, to promote prosecution, arguments will be presented distinguishing the claimed invention over Bogdanski et al. and Soma et al..

In more detail, new independent Claim 17 (which replaces original Claim 1) is directed to a ceramic heater including a ceramic substrate having a thickness of less than or equal to 25 mm, and at least one heating element area including a resistance heating element formed on a first surface of the ceramic substrate. Further, a heating face of the ceramic

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substrate is on a second surface of the ceramic substrate that is opposite to the first surface, and an outermost circumference of the at least one resistance heating element area is within 35 mm from an outside edge of the ceramic substrate. The features recited in new independent Claim 17 are supported by the originally-filed specification and at least at page 2, line 35, to page 3, line 1. New dependent Claim 21 is supported in the specification at least at page 11, lines 12 and 13, and new dependent Claims 18-20 correspond to the original dependent claims.

In a non-limiting example, Figures 1 and 2 illustrate a ceramic heater 10 including a ceramic substrate 11 and at least one resistance heating element area including a resistance heating element 12a formed on a first surface of the ceramic substrate 11. A heating face 11a of the ceramic substrate 11 is on a second surface of the ceramic substrate 11 that is opposite to the first surface. Further, as shown in Figure 1, an outermost circumference of the at least one resistance heating element area is within 35 mm from an outside edge of the ceramic substrate 11 (the dimension “L” shown in Figure 1).

Further, because a resistance heating element area is within 35 mm from the edge of the ceramic substrate, it is not necessary to form an insulating ring. Thus, the reduction of the peripheral temperature of the ceramic substrate 11 can be prevented even if the ceramic substrate is fixed with a supporting case 51 shown in Figure 3 through a supporting pillar 56 in which the ceramic substrate is held while being in non-contact with the supporting case 51. Therefore, the structure is simplified (see the English translation at page 2, line 46, to page 3, line 8).

In addition, the temperature difference in the heating face can be reduced, and the generation of cracks caused by a rapid increase and decrease in temperature can be prevented. Moreover, because the thickness of the ceramic substrate is 25 mm or less, heating and

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cooling of the substrate can rapidly proceed. This is understood from the examples in the specification. That is, in Examples 1-10, the distance between the outer circumference of the resistance heating element area and the outer circumference of the ceramic substrate is 0.5 to 35 mm. As shown in Table 1, the temperature difference in the heating face is as small as 2°C to 4°C. A crack is not generated even with a rapid temperature rise. Further, the temperature reduction time is as short as two minutes. This is because a cooling fluid is brought into direct contact with the resistance heating element.

On the other hand, in the Comparative Examples 1 and 2, where the distance between the outer circumference of the resistance heating element area and the outer circumference of the ceramic substrate is 40 mm, the temperature difference in the heating faces is as large as 8°C, and a crack is generated. In Comparative Example 3, where the resistance heating element is inside the ceramic substrate, the temperature reduction time is as long as 10 minutes. This is because a cooling fluid is not directly brought into contact with the resistance heating element, and the remaining heat cannot be forcibly cooled.

Further, Bogdanski et al. discloses a cooking system including a ceramic hot plate body 14 and a heating means 17. The hot plate body 14 includes non-oxide ceramic (see column 2, line 19) and has an average thickness of between 2 and 5 mm (see column 3, lines 2 and 3). The outstanding Office Action indicates the heating element 17 in Bogdanski et al. extends preferably to the entire upper cooking surface of the electric hot plate and cites column 6, lines 46-50. However, this section only explains that the hot plate body is extremely flat. Bogdanski et al. does not teach or suggest the distance between the outermost circumference of the heating means 17 and the edge of the hotplate body 14 being within 35 mm.

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In addition, Soma et al. discloses a wafer heater including a discoidal substrate made of a sintered ceramic, and a resistance heating element buried in the substrate (see Claim 1). The resistance heating element is not on the surface of the substrate. Therefore, the heater according to Soma et al. differs from the claimed heater. In addition, the heater in Soma et al. corresponds to the heater illustrated in Comparative Example 3 in the present specification having a lengthy temperature-reduction time.

Accordingly, it is respectfully submitted new independent Claim 17 and each of the claims depending therefrom are allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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